Breakout Session 1: Space Cooling Roadmap for Southeast Asia

6 April 2021

International Energy Agency

International Energy Agency

Introduction and Session Overview

Michael Oppermann, Policy Analyst, IEA

6 April 2021

Introduction and Session Overview

- Today marks the first of our stakeholder engagements to support the development of both the buildings and construction and cooling roadmaps.
- We'll be conducting further webinars from April to July 2021, with publication of the roadmap report expected late 2021, so please stay tuned for further opportunities to participate.

5 min	**Introduction and Session Overview** Mr. Michael Oppermann, Energy Analyst, International Energy Agency
10 min	**Sustainable Cooling in Southeast Asia** Dr. Kevin Lane, Energy Analyst, International Energy Agency
45 min	**Space cooling policies and programmes** Panel discussion
55 min	**Business models and finance for sustainable cooling** Panel discussion Moderator: Dr. Zulfikar Yurnaidi, Senior Officer, ASEAN Centre for Energy
5 min	**Summary and Next steps** Mr. Michael Oppermann, IEA

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Which country are you from?

Mentimeter

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International Energy Agency

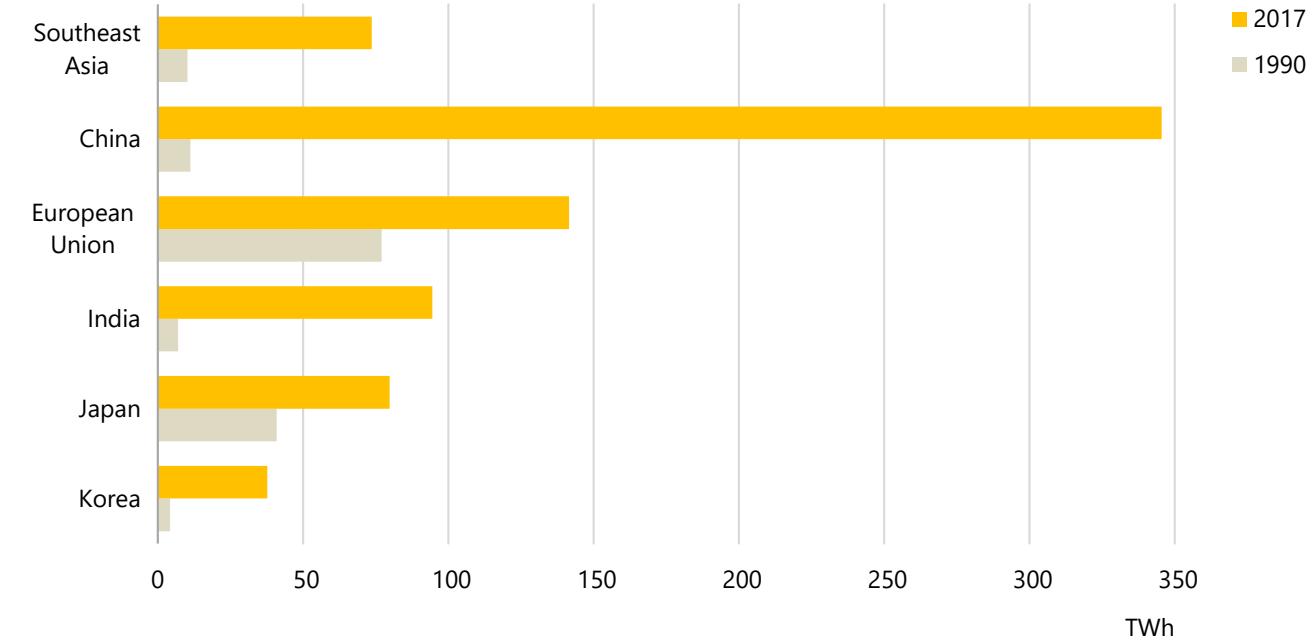
Sustainable Cooling in Southeast Asia

Dr. Kevin Lane, Senior Energy Analyst, International Energy Agency

6 April 2021

Energy consumption for cooling in Southeast Asia is growing

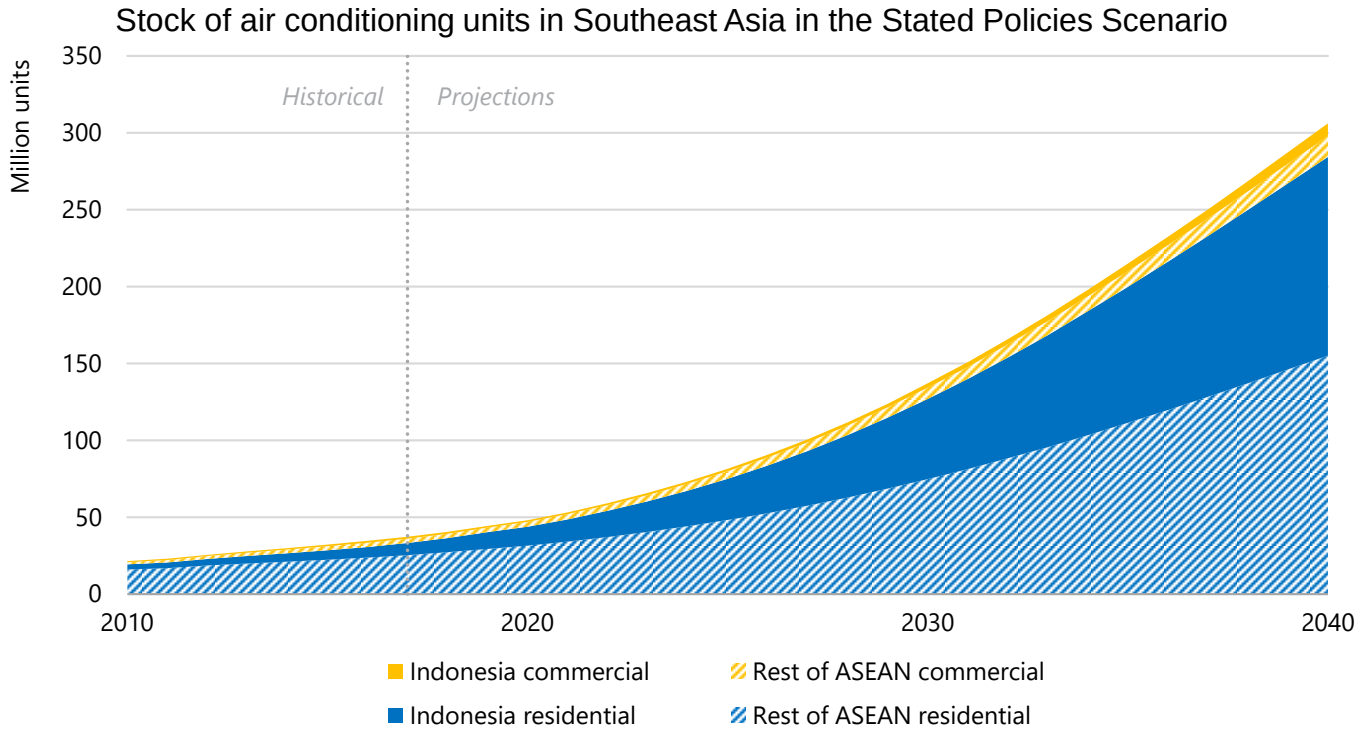
Electricity consumption of air conditioning systems in residential and commercial buildings by country or region



Note: TWh = Terawatt hours.
Source: IEA, Southeast Asia Energy Outlook 2019

Electricity use for cooling in buildings across Southeast Asia increased 7.5 times from 1990 to 2017

AC ownership in ASEAN countries continues to grow rapidly

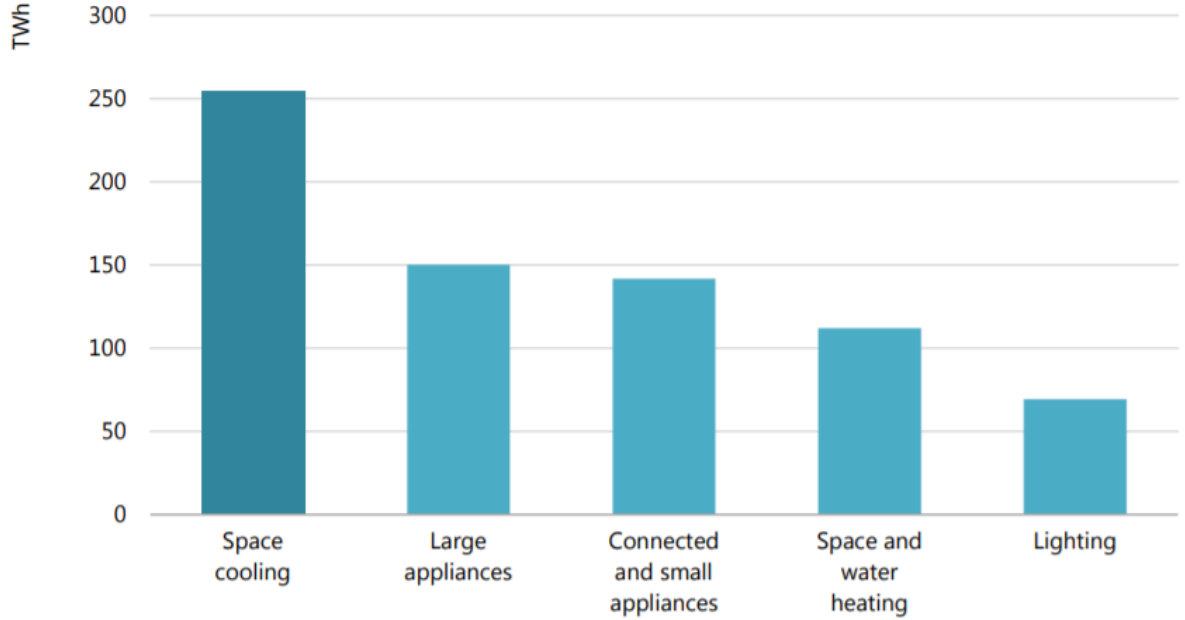


Source: IEA, Southeast Asia Energy Outlook 2019

Without new policy action AC ownership is expected to reach 300 million units by 2040

Rising demand for cooling could exacerbate strains on the power system

Sources of electricity demand growth in buildings to 2040 in SE Asia in Stated Policies Scenario



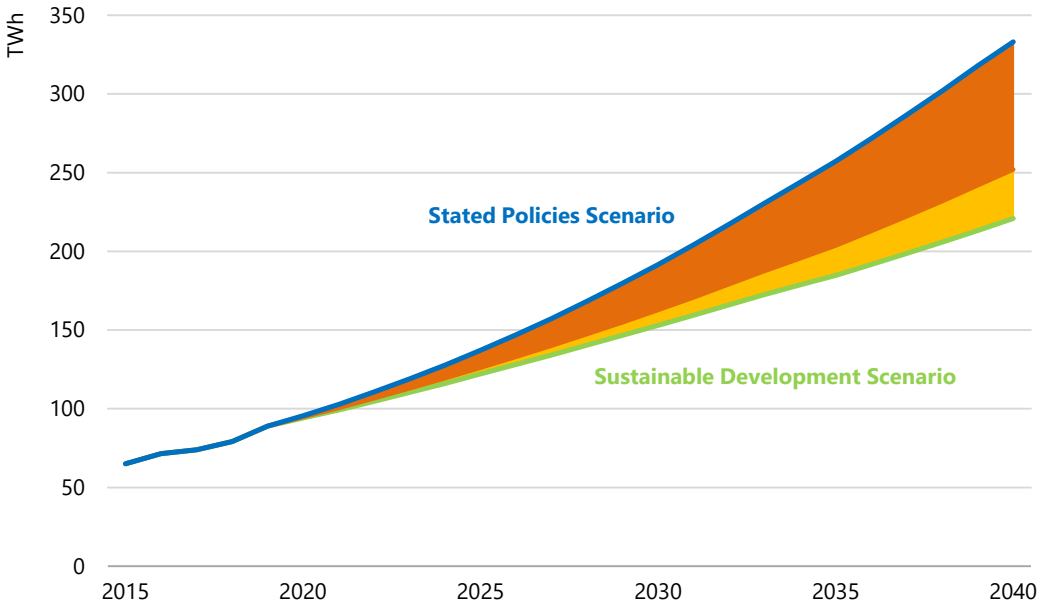
Note: TWh = terawatt-hours.

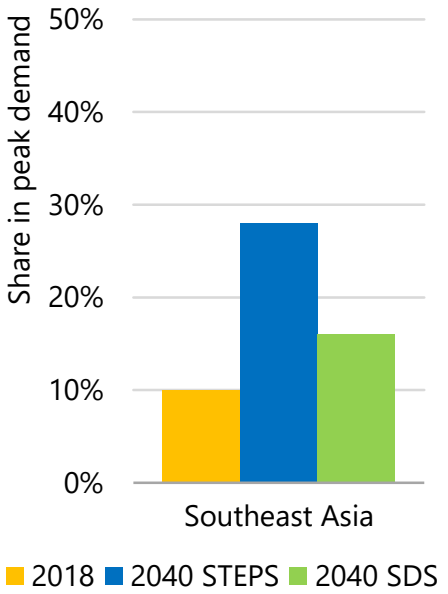
Source: IEA, Southeast Asia Energy Outlook 2019

Space cooling is the largest source of electricity demand growth to 2040 under current policy settings

Energy efficiency could bring huge benefits for Southeast Asia

Reduction in cooling energy demand (left) and cooling's share in peak demand (right) in SDS compared to STEPS





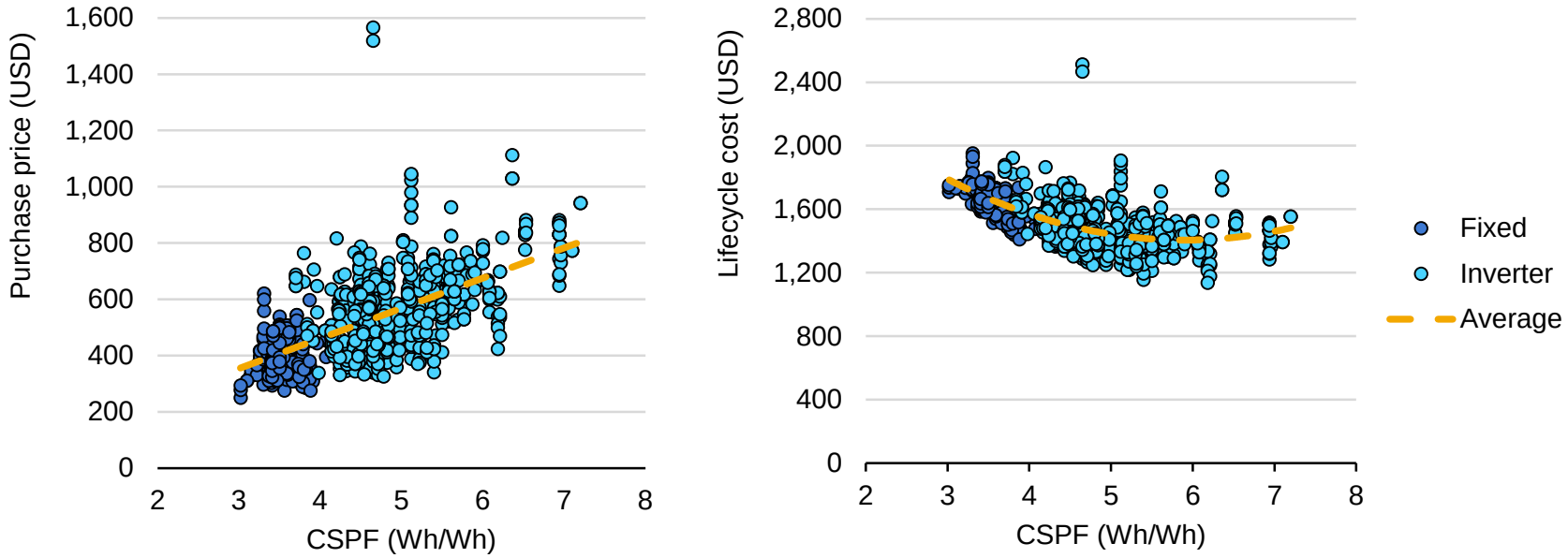
Note: TWh = Terawatt hours
Source: IEA, Southeast Asia Energy Outlook 2019

Source: IEA (2019), Future of Cooling Southeast Asia

More efficient air conditioners and buildings can deliver energy savings, security and GHG reduction benefits

A snapshot of the residential AC market in Viet Nam

Normalised purchase price and lifecycle cost vs. efficiency in Viet Nam in 2019



Note: ACs normalised to electricity consumption of 1,000 kWh/year and cooling capacity of 12,000 BTU/hr
Source: IEA (2020), Energy Efficiency 2020. Based on CLASP

Energy-efficient ACs are cheaper over their lifetimes and some models already have a below average purchase price.

Policy packages for cooling appliances

Regulation

Regulations “push” up energy efficiency across the market, including:

- Minimum energy performance standards
- Building codes

Information

Information programmes support regulations and incentives, including:

- Labelling
- Audit programmes
- Product registries
- Information campaigns
- Education and training

Incentives

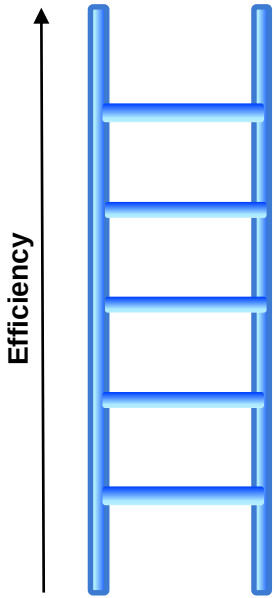
Incentives provide a “pull” to shift the market towards high-efficiency, and include:

- Rebates and loan programmes
- Bulk and public procurement programmes
- Manufacturing and innovation grants
- Equity programmes

Push ***Pull***

How a ladder approach can be used to set future AC and fan requirements

An example of how policy packages could be combined to set a long-term space cooling trajectory



Long-term targets create market certainty and can support sustainable space cooling improvements

In conclusion

- Electricity consumption is rising dramatically, with a significant impact on the grid
- Cost-effective opportunities exist for improving AC equipment efficiency
- Effective and timely policy is required to realise opportunities, especially:
  - MEPS and labelling
  - With future pathway outlined
  - Labelling
- We'll be exploring these issues and pathways to sustainable cooling through efficient ACs and fans as part of this roadmap project Coordinated in the region and globally

Go to www.menti.com and use the code **3094 2852**

In your view, what are the main barriers for sustainable cooling in ASEAN?

Mentimeter

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Space Cooling Policies and Programmes

Alvin Jose

Principal Energy Specialist

Sustainable Energy for All

Wisaruth Maethasith

Engineer

Department of Alternative Energy Development and Efficiency

Ministry of Energy Thailand

Katherine Hasan

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Bintang Widhana

Sustainable, Renewable Energy and Energy Efficiency Officer

ASEAN Centre for Energy

Moderator: Michael Oppermann, Energy Analyst, International Energy Agency

Towards Sustainable Cooling in ASEAN

Alvin Jose
Principal Energy Specialist
Sustainable Energy for All
alvin.jose@seforall.org

COOLING FOR ALL | COOLING AND THE SUSTAINABLE DEVELOPMENT GOALS

Sustainable cooling enables **economic growth** for those in poverty

Cooling **reduces food waste** and **increases nutritional value of food** that reaches people

Cooling **reduces heat stress** and improves sleep, increasing physical and mental well-being

Cool schools **improve learning outcomes** and reduce fatigue

Cool cities, buildings and homes support **equal opportunity for women and men**

Sustainable cooling **reduces energy use** and peak demand, while enabling **more reliable energy access**

Cooling **increases worker productivity** and increases profits

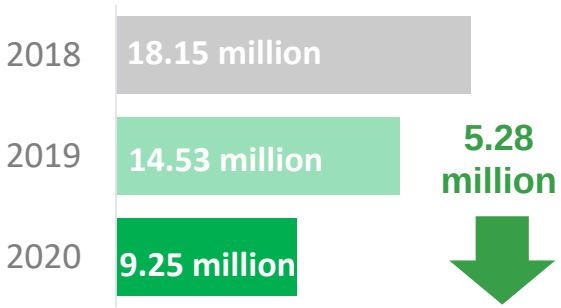
Cool cities, cold chains and public institutions **reduce inequalities** based on gender, wealth or location

Cool cities **support urban populations** by improving their health and productivity

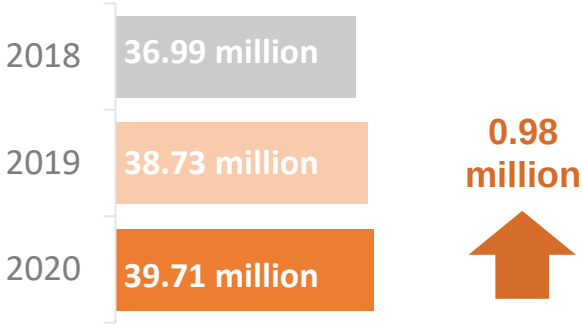
Sustainable cooling **emits no or minimal** energy-related and refrigerant **emissions**

COOLING ACCESS | POPULATION AT HIGHEST RISK IN SOUTHEAST ASIA*

RURAL POOR



URBAN POOR



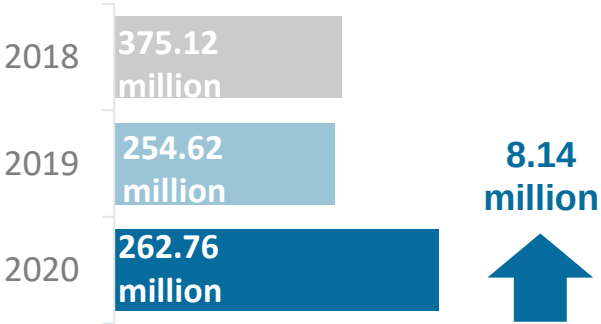
- Positive trend for rural poor all SE Asia countries, with major improvements in **Indonesia, Myanmar and Philippines**

- Increase of urban poor populations at risk for access to cooling – **largely in Philippines**, followed by **Indonesia, Lao PDR and Myanmar**

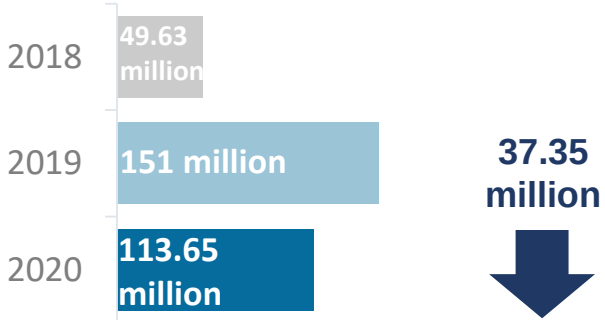
Source: SEforALL analysis, Chilling prospects 2020. Note: numbers may not sum due to rounding
*ASEAN states except for Brunei, Malaysia and Singapore

COOLING ACCESS | POPULATION AT HIGHEST RISK IN SOUTHEAST ASIA

LOWER-MIDDLE INCOME



MIDDLE INCOME



- Except Thailand, All countries seen a rise in lower middle income – largest in **Indonesia, Myanmar Philippines**
- Largest decrease in middle income cooling access issues in Indonesia, Philippines , and Thailand. Significant increase in Vietnam.

Source: SEforALL analysis, Chilling prospects 2020. Note: numbers may not sum due to rounding

ACCESS TO COOLING | FROM COOLING NEEDS ASSESSMENT TO SOLUTIONS

THREE COOLING FOR ALL - COOLING NEEDS

COMFORT & SAFETY

FOOD & NUTRITION

HEALTH & CARE

COOLING SOLUTION APPROACH FOR OPTIMIZATION

TECHNOLOGY

SERVICES

POLICY

FINANCIAL

FOUR COOLING FOR ALL - COOLING SOLUTION PILLARS

THANK YOU!

SUSTAINABLE ENERGY FOR ALL

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Special thanks to the Cooling for All funders:

KIGALI COOLING EFFICIENCY PROGRAM

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

CIFF CHILDREN'S INVESTMENT FUND FOUNDATION

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Roadmaps Towards Sustainable and Energy Efficiency Buildings and Cooling in Southeast Asia Workshop

Department of Alternative Energy Development and Efficiency (DEDE)

Mr.Wisaruth Maethasith

6 April 2021

Energy Regulation And Conservation Division

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

กระทรวงพลังงาน
MINISTRY OF ENERGY

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

Space-cooling Policies in Thailand

Building Energy Code (BEC)

- Approved by the cabinet on July 8th, 2020
- Requiring new or retrofitted buildings (9 types – total area ≥ 2,000 m2) to comply with building energy code
- To be enforced progressively for private sector within 2021
- For Air-Conditioning System:
  - Small: COP ≥ 3.22
  - Large: ≤ 1.33 – 0.5 kW/TR

Regional collaboration on air conditioners standards and market verification/enforcement

- One of the works under EE&C-SSN of ASEAN
- Various works (some in-progress) are being conducted.
  - Harmonization of standards, testing methods, evaluation, etc.
  - Mutual Recognition Agreement of testing results.
  - Regional database

Standard and Labeling Program and incentives

- HEPS and MEPS standards:
  - MEPS: EER ≥ 2.53 – 2.82
  - HEPS: SEER ≥ 14.0 – 22.5 BTU/hr/W
- Incentive in various forms: subsidy, soft loan, performance-based support, innovation list, etc.
- Recent focus: High-efficiency technologies e.g. magnetic bearing chiller, BEMS, innovative technologies e.g. utilization of IoT etc.

Refrigeration and Air Conditioning Nationally Appropriate Mitigation Action (RAC NAMA)

- Collaboration between GIZ, EGAT, and DEDE
- Support the usage of environmentally-friendly refrigerant (R32) via various schemes.
  - soft loan/subsidy program for AC production line modification, promotion of the new refrigerant, marketing schemes, testing facilities

CLASP Southeast Asia

IEA-ACE Virtual Workshop

April 6, 2021

clasp

Efficient Appliances for People & the Planet

Cooling EE Policy in ASEAN

Air Conditioner
ASEAN Harmonization Target in 2020

Electric Fan

Image: https://www.cfr.org/backgrounder/what-asean

CLASP Technical Assistance
Cooling Appliance Policy Development and Compliance in ASEAN

Compliance

Policy Development

Research & Communication

- **National and regional compliance support for ACs**
  - Cambodia and Lao PDR, development of policy compliance frameworks (Oct 2020)
  - Vietnam, pilot market surveillance project (ongoing, 2021)
  - The Philippines, recommendations for regulation, development of administrative guidelines (Oct 2020)
  - Indonesia, assessment of compliance framework (Mar 2021)
  - ASEAN, development of voluntary market surveillance guidelines for member states & Round Robin Testing exercise to strengthen regional testing capacity (Dec 2020)
- **Studies and Policy Recommendations**
  - Philippines, RAC (Jan 2019)
  - Vietnam, RAC (Jun 2019)
  - Thailand, RAC (Jun 2019)
  - Indonesia, national market study on comfort fans, national end-use survey (Jun 2020)
  - The Philippines, comfort fans (Dec 2020)
  - Thailand, energy labeling study (ongoing, 2021)

Air Conditioner Labeling in Thailand

*CLASP is collaborating with the Electricity Generating Authority of Thailand (EGAT) for the revision of the **voluntary** EGAT No.5 for air conditioners.*

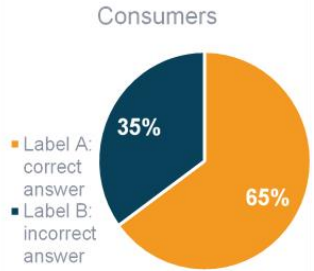
ditional reading reference

In 2020 we led **consumer, retailer and manufacturer surveys** to determine understanding and perceptions of the label; how the label impacts consumer purchasing decisions; whether stakeholders understand the format of the label.

94% of the consumers would not buy an unlabeled product

FIGURE 1 CONSUMER UNDERSTANDING OF LABELS FOR DIFFERENT AC TECHNOLOGIES

Label A Label B



Labeling recommendations from the 2020 surveys:

- Implement the **same rating criteria** and efficiency requirements for both fixed speed and inverter ACs.
- Develop and communicate a **mid- to long-term roadmap** of policy revisions to facilitate industry support and drive climate goals.
- Develop a **strategy to enhance consumer understanding** of the star ratings and to facilitate access to labeling information online.
- Do **not include an additional CO2 icon** on the label.

Currently, CLASP is continuing collaboration with EGAT to provide them with **evidence-base** to advance the labeling revision by:

1. Developing an **AC labeling roadmap from 2023-2030** to be integrated in the EGAT's Masterplan, with the goal to provide manufacturers with certainty as for the policy direction and to adequately prepare for investments;
2. Conducting international research and knowledge exchanges to complement the **"Smart Labeling Scheme"** EGAT has been developing together with the Electrical and Electronics Institute (EEI), which aims to connect the label with mobile applications; and;
3. Reviewing **sustainability criteria** to be integrated into the energy labeling scheme, including **circular economy** concepts.

Air Conditioner Compliance
Market Surveillance Pilot Activities in Vietnam

ditional reading reference

- In 2020, CLASP and a local partner, Ecology and Environment Institute (EEI), conducted an **assessment of the energy efficiency compliance framework** in Vietnam and market surveillance activities on the room air conditioner market.
- Based on this study, CLASP and EEI are now **piloting a series of market surveillances activities** with collaboration from MOIT and local market inspectors.
- These activities are in support of the newly established General Directorate of Market Surveillance (under MOIT)

Activity 1: Identifying High Risk Products	• Piloting a criteria-based approach and a custom-built Excel tool to identify products for testing based on non-compliance risk
Activity 2: Online Market Monitoring	• Testing the effectiveness of online market monitoring in Vietnam, given current resources and regulatory requirements. Online labeling is not yet mandatory
Activity 3: Retailer Training	• Piloting a training to educate retailers on the energy label and relevant regulations to promote consumer awareness and compliance at the point of sale
Activity 4: In-Store Label Inspections	• Conducting in-store inspections with HCMC inspectors to assess compliance with labeling regulations
Activity 5: Verification Testing	• Overseeing verification testing of 10-15 room ACs identified as high-risk or potentially noncompliant
Activity 6: Enforcement	• Identifying appropriate enforcement actions for any cases of non-compliance

Promotion of Higher Efficient Air Conditioners in ASEAN through Harmonisation of Standards and Strengthening Market Verification and Enforcement Capabilities

Roadmaps Towards Sustainable and Energy Efficient Buildings and Cooling in Southeast Asia - Workshop

6 April 2021

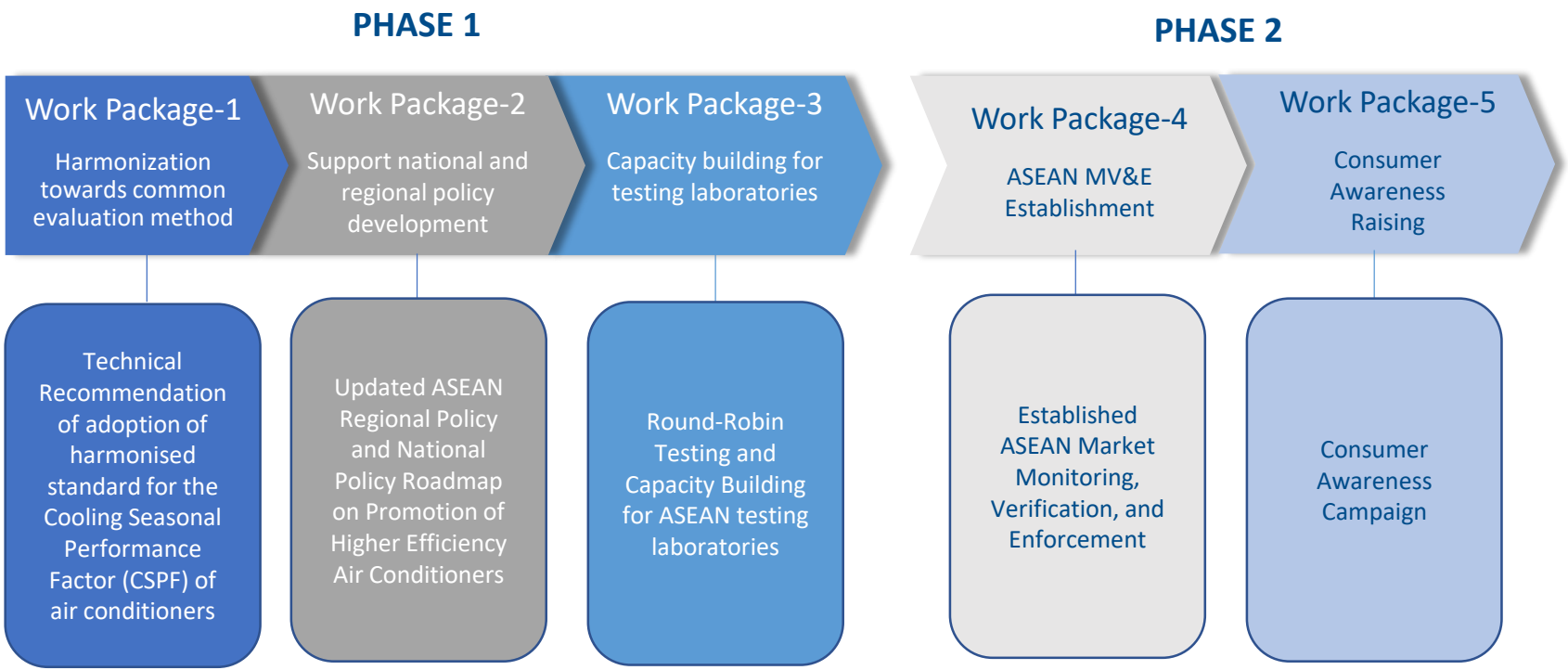
Presented by:
ASEAN Centre for Energy

One Community for Sustainable Energy

Introduction

ACE established a Project Management Office (PMO) which will be overseeing the overall implementation of the project.

Introduction



Project Update

Work Package 1 - Harmonisation towards a common evaluation method

Work Package 2 - Support to national and regional policy development

Work Package 3 - Capacity building for testing laboratories3

Milestones - National Consultation Activities

- ASEAN member countries have adopted ISO Temp Bin for product certification (conformity assessment).
- Each MEPS and labeling program in ASEAN has developed its own formula to estimate AC annual energy consumption for consumers.

	Brunei Darussalam	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
ISO 16358		Y	Y	Y	Y	Y (by 2022)	Y	N	Y	Y
ISO 5151		Y	Y	Y	Y	Y (by 2021)	Y	Y	Y	Y
Metric		CSPF	CSPF	CSPF	CSPF	EER, CSPF	CSPF	WCOP (WEER)	CSPF	CSPF
Temp Bin		ISO 16358	ISO 16358	ISO 16358	ISO 16358	ISO 16358	ISO 16358	NA	ISO 16358	ISO 16358

Key Points from Regional Workshops

1. **Harmonization of Testing Methods** – Completed except for Myanmar to adopt ISO 5151:2010 by 2021. – **Completed**
2. **Harmonization of Evaluation Method** – For fixed speed and inverter based ACs the ASEAN countries will report the performance as EER or CSPF.– **Most AMS have already adopted ISO 16358, or regulations are awaiting final approval.**
3. **Harmonization of MEPS** - Notification of a minimum EER (also refers to weighted EER) of 2.9 W/W or CSPF of 3.08 Wh/Wh by 2020 as mandatory MEPS for all fixed and variable drive ACs below 3.52kW capacities. - **Most AMS have already met or even exceeded the ASEAN Regional MEPS, or regulations are awaiting final approval.**
4. **Testing Infrastructure** – An appropriate framework for round robin testing (RRT) and evaluation process for testing facilities are established by 2020. – **AC testing labs in ASEAN have been collaborating on RRT.**

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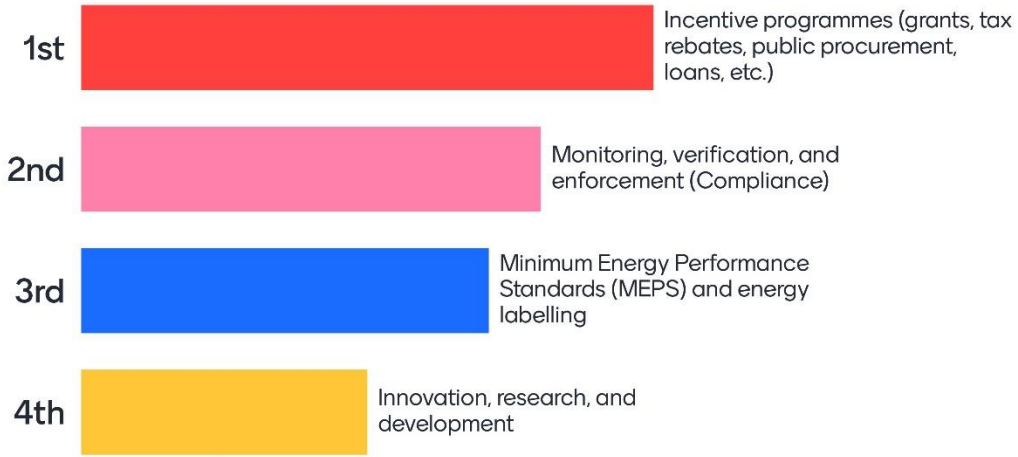
Rank the following policies, from most to least important for sustainable cooling

Mentimeter



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Space Cooling Policies and Programmes – Q&A

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Moderator: Michael Oppermann, Energy Analyst, International Energy Agency

Business Models and Finance For Sustainable Cooling

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Sustainable Development Capital, LLP

Hanh Le

Vietnam Country Representative

Global Green Growth Institute

Muhammad Zeki

Analyst

Climate Policy Initiative Indonesia

Dimitris Karamitsos

Senior Energy Efficiency Business Developer Specialist

BASE

Moderator: Dr Zulfikar Yurnaidi, Senior Officer, ASEAN Centre for Energy

IEA "Roadmaps Towards Sustainable and Energy Efficient Buildings and Cooling in Southeast Asia"

Breakout Session 1: "Business Models and finance for sustainable cooling"

James A Maguire, Partner
Sustainable Development Capital LLP

April 6, 2021

Contents

K-CEP Leadership Team

James Maguire, Partner SDCL Asia

- Partner, SDCL
- Jim has 25 years' experience across insurance, project finance and infrastructure development in Asia
- Previously led the Asia risk advisory and syndication businesses for the two largest insurance brokerages

Peter Hobson, Investment Director SDCL

- Investment Director, SDCL
- Peter has 35 years' experience in project finance and development banking across the energy and natural resources sectors in Europe, Asia and Australasia
- Previously responsible for energy efficiency business development at the EBRD

Jonathan Maxwell, CEO SDCL

- CEO and Co-founder of SDCL
- 20 years' experience in international financial markets
- Experience in infrastructure, real estate, private equity and public markets
- Managed the IPO of HICL in 2006 and sponsored the IPO of SEEIT in 2018

Sustainable Development Capital, LLP (“SDCL”) Overview

SDCL is a global investment firm with a proven track record of investment in sustainable infrastructure projects in Asia, the UK & Europe and North America

SDCL Background

- Established 2007, SDCL is a London headquartered investment firm with a proven record of investment in sustainable energy generation projects globally
- SDCL manages over US$1.5 billion of public and private capital investing in efficient and decentralized energy solutions
- SDCL manages four private funds: UK (launched Q4 2012), Ireland (launched Q1 2014), Singapore (launched Q2 2014) and USA (launched Q1 2015).
- SDCL finances energy efficiency refurbishment and distributed generation projects that have a positive impact on consumers, society and the environment
- SDCL is the investment manager for SEEIT (launched Q4 2018), the first energy efficiency investment company listed on the London Stock Exchange
- SDCL awarded grant under the Kigali Cooling Efficiency Program to deliver cooling and energy efficiency projects in Asia and Africa
- SDCL is an Institutional player in a nascent market (energy efficiency and distributed generation)

Key institutional investors

Mitsui & Co.

Investec Wealth & Investment

European Investment Bank

M&G Prudential

Key partner relationships

EDF

edp

ENGIE

SSE

Iberdrola

KIGALI Cooling Efficiency Program

RWE

equinor

SDCL and the Kigali Cooling Efficiency Program

April 2021

Roadmaps Towards Sustainable and Energy Efficient Buildings and Cooling in SEA

Unique Proposition and Market Opportunity

- World is getting hotter – need for investment in cooling efficiency and distributed generation; increased urbanisation means by 2050 up to 70% of population globally will live in cities thereby exacerbating a heating globe
- Global temperatures are rising, possibly by 3ºC or more by 2100; Increases in hot and record-hot weather are disproportionately worse in emerging Asia
- **Sustainable Development Capital LLP ("SDCL")**, as a grantee under the Kigali Cooling Efficiency Program seeks to mobilize US$100 million in capital to address Asia Cooling and Energy Efficiency needs

SDCL activity in Asia

- SDCL's initial portfolio in Asia across **hospitality, manufacturing and real estate sectors** considers 23 Investment Grade Audits completed, in process or term sheets signed and now at pre-investment stage
- Additional development activity includes c. 541 projects across 58 counter-parties and an aggregate pipeline of US$407 million; the weighted probability pipeline is US$97 million
- SDCL is working with the IEA, IFC, OECD, ADB, K-CEP partners, government ministries and other stakeholders to support cooling and energy efficiency projects during the pandemic ("counter Covid-19 cyclical")

Roadmaps Towards Sustainable and Energy Efficient Buildings and Cooling in SEA – Issues and Considerations

- SDCL focus on cooling and energy efficiency and distributed generation investments within Asia initially targeted hospitality; Covid-19 impact and erosion of asset credit quality
- Strategic recalibration towards the manufacturing and real estate sectors
- Pivot towards a 'hybrid' strategy to combine cooling and energy efficiency with distributed solar
- Focus on improving asset owners' financial, environmental and infrastructure performance

Advanced Pipeline

- Building upon its **K-CEP grant**, SDCL intends to lead the transition to energy-efficient, climate friendly and affordable cooling solutions in Asia based on the Cooling as a Service ("CaaS") business model
- SDCL pipeline of projects in the energy efficiency and cooling sector in, broadly, **ASEAN** – Singapore, Indonesia, Thailand, Philippines, Malaysia and **Greater Mekong Sub-Region** (Vietnam); and, Hong Kong

Roadmap #1: Insurance and Cooling & Energy Efficiency

April 2021

The Value Proposition – “Managing risk is the purpose of the insurance industry; better understanding climate-related risks and opportunities will position the industry as a transparent, accountable, stable and resilient partner in tackling climate change” *

The Context

- Insurance Industry as Long-Term Investor (“LTI”) is significant investor/owner of Real Estate
- Property Portfolios or ‘TIV’ of global insurers’ clients typically dwarf asset management holdings
- Insurers positioned to lead the global market for energy efficiency which is expected to reach US$27 trillion globally (Source: IFC: “Green Buildings: a finance and policy blueprint for energy markets” www.Ifc.org, 2019.)
- Climate Change highlights the need for insurance industry leadership in energy efficiency in the built environment
- Growing demand from investors for a wider universe of green and sustainable investment - value green credentials

Energy Efficiency retrofits help

- Avoid Green House-Gas emissions that contribute to Climate Change reducing weather volatility
- Improve financial, environmental and infrastructure performance and builds asset resilience
- Improve Property Loss Control and occupant safety at the asset level, reducing insurance claims
- Support development of Green Insurance Products – “Energy Savings Insurance”
- Premium discounts and green-specific risk management labelling similar to green mortgages, loans or sustainable linked loans markets

“The Principles for Sustainable Insurance provide a global roadmap to develop and expand the innovative risk management and insurance solutions that we need to promote renewable energy, clean water, food security, sustainable cities and disaster-resilient communities.”

UN Secretary-General (June 2012)

* Source: UNEP, “Insuring the Climate Transition”, January 2021

Roadmap #2: Hospitality and Cooling & Energy Efficiency

Value Proposition: Cooling Efficiency for international brand to meet sustainability targets

Country	Indonesia (Bali)
Hotels	Global hospitality brand X ▪ Capex: US$501,486 ▪ kWh Saved p/a: 1,228,506 ▪ US$ Saved p/a:$100,598 ▪ Current Performance: 1.176 kW/RT ▪ Target Performance: 0.65 kW/RT ▪ Improvement (%): 45% IGA is completed, funded by SDCL. Asset owner owns two hotels.
Energy Efficiency Measures	▪ Replace current 2 x 250 RT Carrier water-cooled chillers + 2 sets CHWP and CDWP, retrofit 2 existing cooling towers, new CPA .
Capex	To be financed by SDCL
Financing Issues & Barriers	• Global hospitality ‘brand standards’ • Covid-19 erosion of counterparty credit • Indoor Air Quality and Nat Cat Risk • Need for Public Private Partnerships

Important Notice

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Sustainable Cooling in Viet Nam

Innovative financing options

Hanh Le – Country Representative
Hanh.le@gggi.org

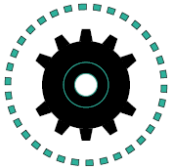
GGGI's Vision, Mission, & Position

Our Vision

A **LOW-CARBON**, **RESILIENT WORLD** OF **STRONG**, **INCLUSIVE**, AND **SUSTAINABLE GROWTH**

Our Mission

GGGI SUPPORTS ITS **MEMBERS** IN THE **TRANSFORMATION** OF **THEIR ECONOMIES** TO A **GREEN GROWTH** ECONOMIC MODEL.



Our Position

A **TRUSTED ADVISOR** & **DEVELOPMENT PARTNER** EMBEDED IN MEMBER & PARTNER GOVERNMENTS

GGGI's Value Chain & Thematic Areas

GGGI Value Chain

Sustainable Energy

Sustainable Landscapes

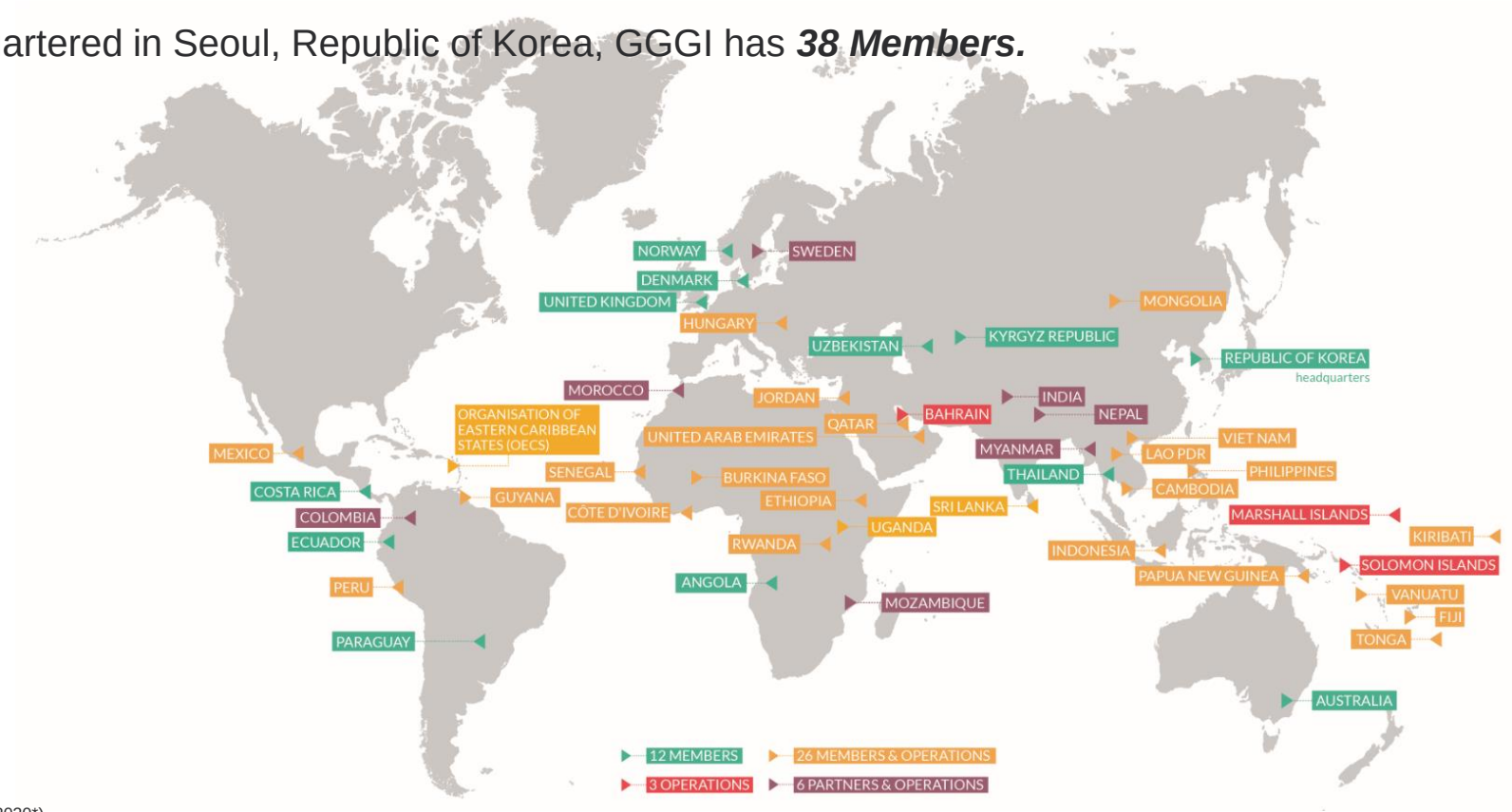
Green Cities

Green Investment Services

Climate Action and Inclusive Development

GGGI at a Glance

Headquartered in Seoul, Republic of Korea, GGGI has ***38 Members.***

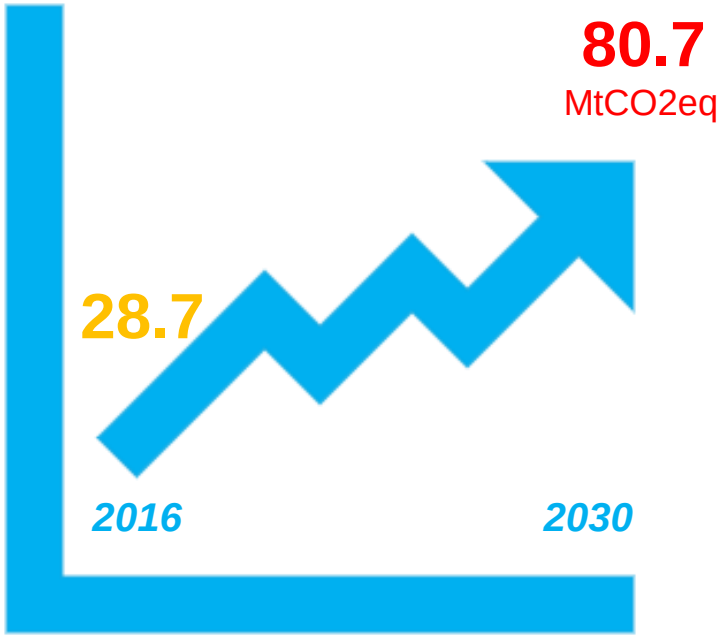


(updated as of Q3, 2020*)

Targets of GGGI Vietnam

GGGI's objective in Viet Nam is to accelerate **sustainable investment**, reduce **GHG emissions**, create more **green jobs**, and strengthen **climate resilience**.

Vietnam RAC Demand



Source: GIZ (2019)

Vietnam's **updated NDC (Sept 2020)** incorporates sustainable cooling as an important mitigation measure.

- Passive cooling measures
- More efficient cooling appliances
- Natural refrigerants

Financing barriers for SC investments

Low electricity tariffs – low incentives

No real ESCO market: credit risk & performance risk

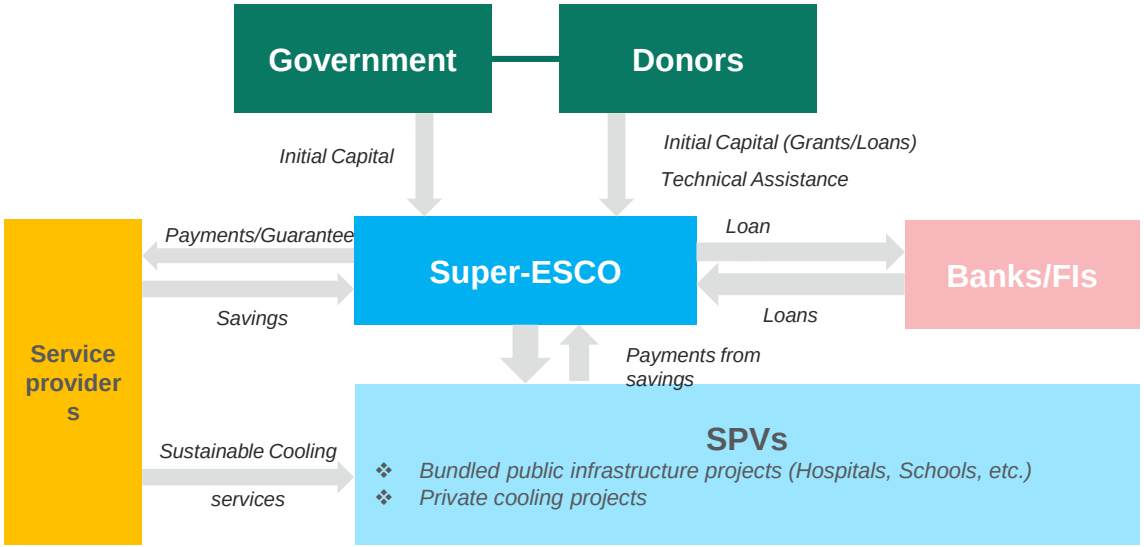
Lack of bankable projects – limited pipeline!!!

Lack of experience from banks – high risk premium

High upfront costs

Innovative business model – Super ESCO

- Address market challenges – bulk procurement
- Support private ESCOs: finance and technical capacity
- Awareness building for customers and banks
- Develop relevant market standards



Innovative financing instruments

Green Bonds

- Eligible for green bonds issuance
- Instruments to access international/domestic capital market
- Strong appetite from investors

Potential sectors for green bond issuance

Source: Potential Market Survey of Green Bond in Vietnam (GGGI, 2020)

National Financing Vehicle

- Public financing mechanism to support non commercially viable projects (e.g passive cooling)
- Vietnam Environment Protection Fund

Thank You

www.gggi.org

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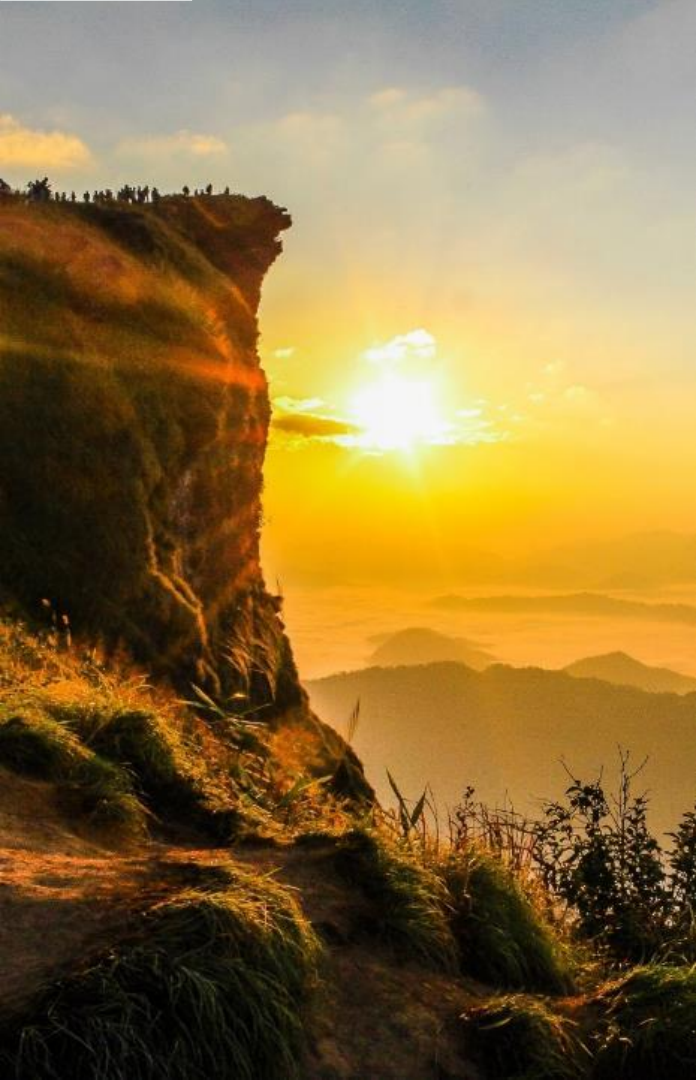


CLIMATE POLICY INITIATIVE

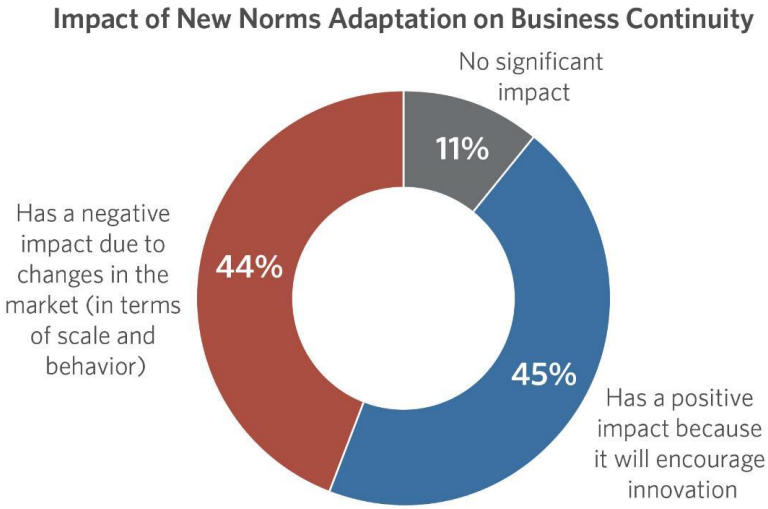
Exploring Viable EE Business Model in Indonesia

Presented in

Roadmaps Towards Sustainable and Energy Efficient Buildings and Cooling in Southeast Asia – Workshop

April 6th, 2021

Summary of MASKEEI - CPI Study in Energy Efficiency during Covid-19 Pandemic: Some business managers feel that the new norms era has a positive impact because it stimulates innovation, but others feel that the impact is negative due to changes in the market



Rank	Change Observed in the New Norms Era
1	Increased role of digital technology and internet in every aspect of life
2	Creation of new business opportunities (startups)
3	Changes in social aspects/community behavior
4	Changes in business and economic practices/models/systems
	Changes in the healthcare system

Most likely will happen

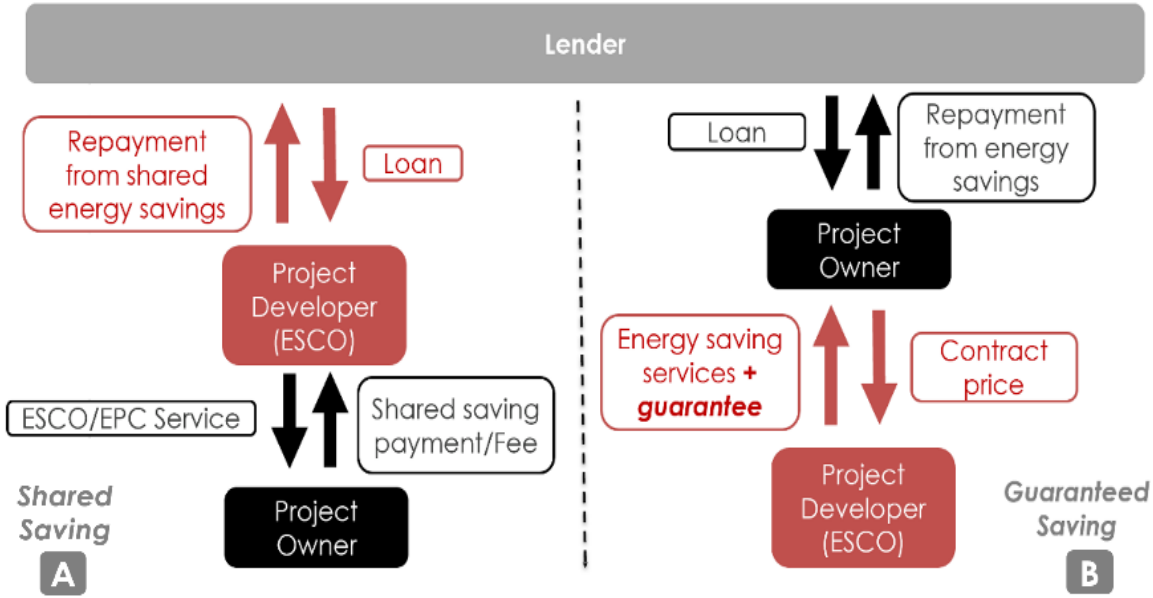
Possibly will happen

CLIMATE POLICY INITIATIVE

Result of Study by PT. SMI – CPI in *Exploring Viable EE Business Model in Indonesia*: All EE business players agree that the perceived financial risk from both client and lender are the biggest hurdle in developing EE project.

RISK	IMPACT	LIKELIHOOD
Economic and Financial: cost increases, interest rates, volatile energy prices, payment default	High	Medium
Financial resources: perceived high investment costs, prohibitive calculations of risk and return, limit the supply of affordable capital and the demand for such investments.	High	Medium
Behavioral and Operational: behavioral biases, rebound effect, faulty operation, unexpected consumption pattern	Medium	Low
Awareness and commitment: lack of knowledge of EE, skepticism and misunderstanding of benefits, conflicting priorities, and a lack of motivation across businesses stymie the potential demand, lack of a convincing business case in contexts with cheap energy and absent regulation	Medium	Medium
Measurement and Verification: Poor data quality, inconsistent measurement, modeling errors	Medium	Medium
Technical solutions and expertise: Insufficient technical capacity, lack of commonality on best practice and standardization of procedures and technologies	Medium	Medium
Contextual and Technology: Poor project design, installation delays, insufficient information on facility, poor equipment design, poor performance	Medium	Low
Regulatory: Changes in grant/subsidy programs, unfavorable financial regulation, conflicting guidelines, changing regulation on financial market	High	Medium

The two main EE business models world-wide are *Shared sharing* dan *Guaranteed saving*. However, the generic implementation of both model has not been successful in answering the EE business barriers in Indonesia



This is a call for improved business models and better contractual agreements to accelerate more energy efficiency projects by private sectors

Existing Improved EE Business Models in Indonesia Market

Exhibit 1: Service-or-Device Business Model

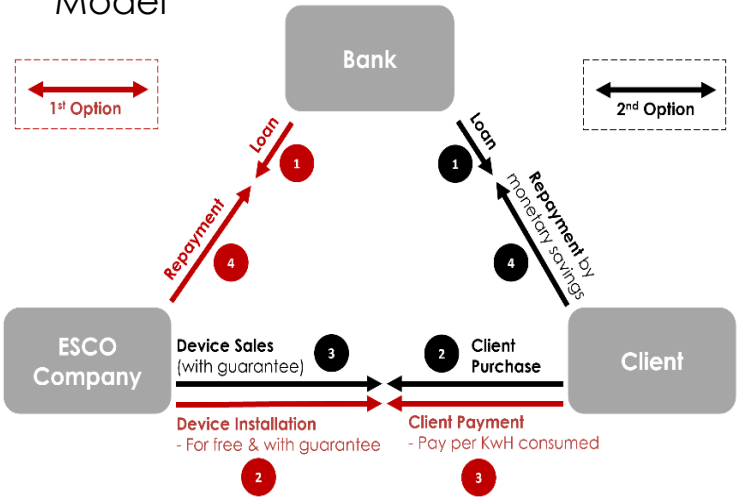
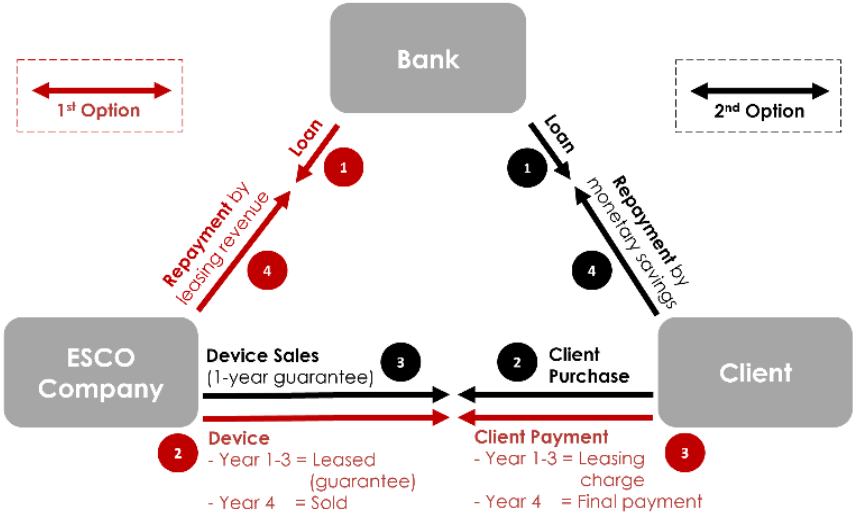


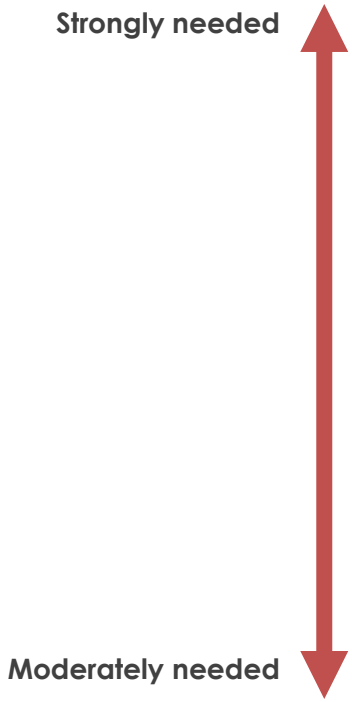
Exhibit 2: Leasing-and-Purchase Business Model



Improved Business Model Vs Risks

RISK	Does the Business Model Alleviate the Risk?	
	Service-or-Device Business Model	Leasing-and-Purchase Business Model
Cost increases – Project Owner	**YES**	**YES**
Payment default - Bank	**YES**	**YES**
Perceived high investment cost – Project Owner	**YES**	**YES**
Prohibitive calculation of risk and return – Project Owner, Bank	**YES**	**YES**
Changing regulation on financial market – Project Owner	**NO**	**NO**

There is room for public finance to support EE business model in Indonesia. Facility managers consider that bank loan interest reduction is the most expected support from the government



Rank	Required Government Support
1	**Bank loan interest reduction**
2	**Income tax deduction**
	Improved policies and regulations to reach a broader market
3	**Energy (electricity/fuel) cost subsidy**
	Financial aid for implementing energy efficiency efforts
4	Financial aid for adjusting business model without layoffs
	Other support: • Less strict regulation and licensing to adjust in the new norms era • Improved pandemic crisis governance • Low-cost liquidity options
5	Working capital credit assistance
6	Partial financial aid for covering labor layoff costs

In terms of policy support, according to project developers, the implementation of incentives or disincentives by the government can encourage the achievement of energy efficiency targets

A significant need exists

The need exists, but not significant

Rank	Required Policy Support
1	**Enforcement of attractive incentives or reasonable disincentives for energy users**
2	Roadmap for achieving national energy efficiency and conservation targets
	Gradual arrangement of energy efficiency mandate
3	Encouragement of ESCO business establishment that are suitable for Indonesian market
4	Market expansion through less strict mandatory energy efficiency enforcement
5	Realization of market potential in the public sector (energy efficiency implementation in state-owned buildings/facilities)

Contact –

CPI: climatepolicyinitiative.org

The Lab: climatefinancelab.org

USICEF: usicef.org

Global Landscape of Climate Finance: climatefinancelandscape.org

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CLIMATE POLICY INITIATIVE

Thank You

CaaS

Cooling as a Service
Refresh the planet

Market Transformation: Servitisation of Cooling Industry

BASE
Driving investment in sustainable energy

KIGALI
COOLING EFFICIENCY PROGRAM

BASE

Driving investment in sustainable energy

Who we are and what we do?

- The Basel Agency for Sustainable Energy (BASE) is a Swiss not-for-profit founded in 2001 whose mission is to develop innovative, actionable financial strategies and market-driven solutions to unlock investment in Sustainable Energy and to tackle climate change.
- Specialized Partner of UN Environment and member of United for Efficiency (U4E).
- We works with a variety of players and acts as a bridge between the public and private sectors.
- Partners: multilateral development banks, national banks, financial institutions, development agencies, intergovernmental and philanthropic organizations.

CaaS

The Cooling Market

Cooling demand is rising dramatically

Cooling demand will **triple by 2050, from 10 to 30% of global electricity consumption** (= China‘s electricity use today) *

Market of **6.9 trillion USD** over next 30 years (**230 billion USD/year**) that could be invested in clean efficient cooling.

*IEA, The Future of Cooling, 2018

ENERGY EFFICIENCY

SERVITISATION - COOLING AS A SERVICE INITIATIVE (CaaS)

The business model aligning people, profit and the planet .

ENDORSED BY:

The Lab
Driving Sustainable Investment

Design and selection of solution based on long term considerations.
Key to a circular economy.

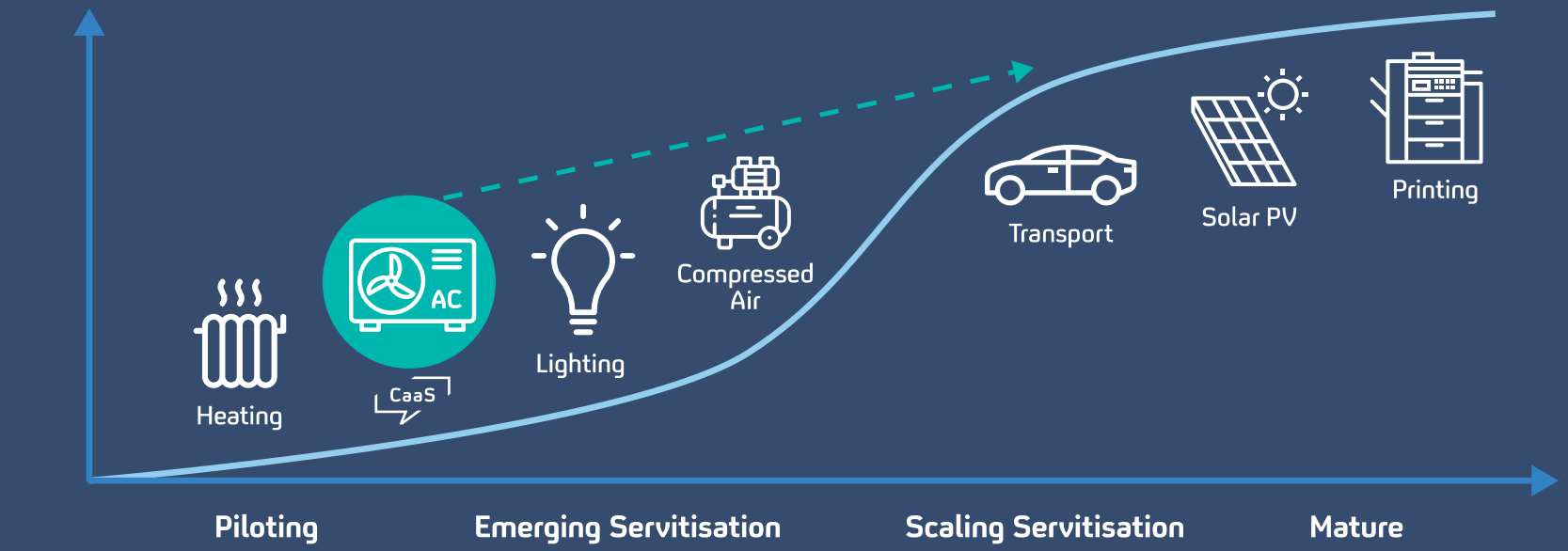
- Maximising operating efficiency makes business sense for the provider.
- Enables a system thinking approach.
- Maximises reutilisation of equipment, and reuse of components through modular designs.
- Encourages providers to keep innovating also for existing customers.

Different to Energy Savings Contracts

CaaS

Servitisation

Mega-trend growing rapidly across equipment industries



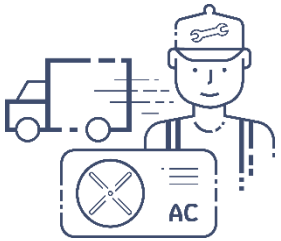
BASE

CaaS

KEY ACTORS AND BENEFITS

Cooling users

- No capital expenditure.
- Off-balance service.
- Full transfer of performance risks.
- User can focus and invest in core business.
- Full out-sourcing of cooling service.



Technology Providers

- Increase demand and deployment of most efficient technologies.
- Predictable and continuous revenue streams.
- Bring additional value by selling outcome instead of selling equipment and parts

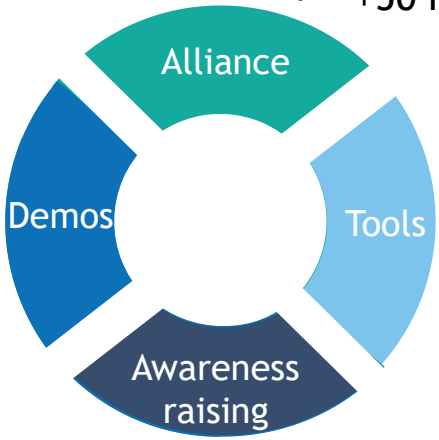
Banks / Investors

- Opportunity to place green funding.
- Projects 400K – 3M which can be bundled.
- Investing in assets generating cashflows.
- Become front-runner to finance servitisation models (new trend).

CaaS

CaaS Initiative Pillars

- +10 Companies supported to implement CaaS



- +50 members on the alliance

- Standardising contracts
- Pricing models
- Explanatory Documentation

- Multiple case studies, articles, webinars, E-summit

www.caas-initiative.org

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CaaS

Cooling as a Service
Refresh the planet

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Business Models and Finance For Sustainable Cooling – Q&A

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Global Green Growth Institute

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Senior Energy Efficiency Business Developer Specialist

BASE

Moderator: Dr Zulfikar Yurnaidi, Senior Officer, ASEAN Centre for Energy

Go to www.menti.com and use the code **8597 9283**

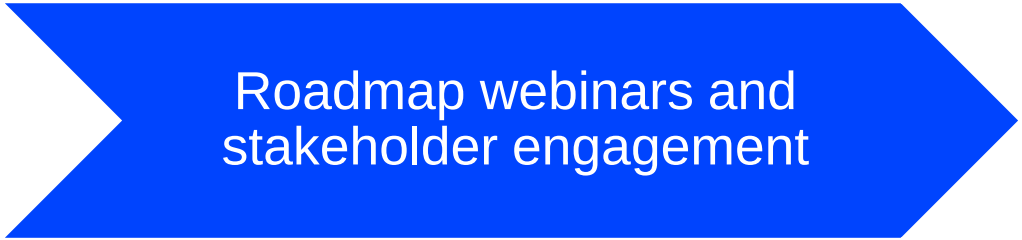
In your view, where can finance have the biggest impact to promote sustainable cooling?

Mentimeter

20

Cooling and Buildings Roadmaps – next steps

- This workshop is the first of many events as part of this project
- Thank you for your participation today!



- We’d like your input – if you have good case studies, reports, or datasets to support our roadmap on sustainable space cooling in Southeast Asia, please email me : michael.oppermann@iea.org

energy.efficiency@iea.org